UNITED STATES PATENT AND TRADEMARK OFFICE

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10/713,789	11/14/2003	Alastair James Buchanan	1-24912	8772

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EXAMINER
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3663	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *12 October 2007*.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-14 and 16-23* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-14 and 16-23* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b) ☐ Some *   c) ☐ None of:

      1. ☒ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2.   Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing

to particularly point out and distinctly claim the subject matter which applicant regards as the

invention.

In claim 6, it is not clear what all is meant and encompassed by the phrases "an edge

detected pointing of lane boundaries" and "an image plane to the real world plane". Applicant

can be their own lexicographer, but applicant cannot be repugnant.   It is not clear what all is

meant and encompassed by the limitation, "convert the points corresponding to lane boundaries

from an image plane to the real world plane". Applicant copies and pastes that limitation from

the specification and does not distinctly disclose the claimed subject matter.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4.   Claims 1-23 are rejected under 35 U.S.C. 102(b) as being anticpated by Sawamoto et al

(EP 0890470 A2).

Regarding claim 1, Sawamoto et al (abstract) disclose a target vehicle sensing apparatus for a host vehicle, the apparatus comprising:

a lane detection apparatus provided on the host vehicle which includes an image acquisition apparatus configured adapted to capture an image of at least a part of the road ahead of the host vehicle (col. 6, lines 10 et. seq., line 33);

a vehicle path estimation apparatus configured to estimate a projected path for the host vehicle (e.g. col. 7, lines.28 to 54, abstract);

a target vehicle detection means located on the host vehicle which is configured to identify the position of any target vehicles located on the road ahead of the host vehicle (Figs. 3&4), the position including data representing the distance of the target vehicle from the host vehicle (col. 5, lines 50-54);

first data processing apparatus configured to predict a target lane (abstract, fig. 3 and 4) in which the host vehicle will be located when it has traveled along the projected path by the distance to the target vehicle (col. 9, lines 14-44 et. seq., fig. 7);

second processing apparatus configured to compare the position of the target vehicle determined by the target detection apparatus with the position of the target lane to provide a processed estimate of the actual position of the target vehicle (col.7, lines 38 et seq., col. 9 lines 43 et seq.).

In the prior art (col. 9, lines 46 to col. 10, line 11) the processor 62 clearly predicts the position of the host vehicle in a future path. The processor 62 predicts the future path of the host vehicle relative to a target vehicle when the host vehicle has traveled a distance between the host vehicle and the target vehicle (see particularly col. 9, line 51 and col. 10, lines 5-11).

Regarding claims 2, Sawamoto et al (abstract) disclose the apparatus of Claim 1 in which the processed estimate comprises an indicator of whether or not the target vehicle is in the same lane as the host vehicle is projected to be in when the host vehicle has traveled along the projected path by the distance to the target vehicle (col. 2, lines 47-57; col. 9, lines 16-53; col. 10, lines 5-24).

Regarding claims 3, Sawamoto et al (abstract) disclose the apparatus of Claim 1, in which the image acquisition apparatus of the lane detection apparatus comprises a video camera 54 (fig. 3) which is configured to produce at least one two-dimensional image of an area of the road in front of the host vehicle (col. 6, lines 33-41).

Regarding claims 4, Sawamoto et al (abstract) disclose the apparatus of Claim 1 in which the at least one image is passed to an image processing unit 55 (fig. 3).

Regarding claims 5, Sawamoto et al (abstract) disclose the apparatus of Claim 4 in which the image processing unit is configured to filter the at least one image to identify artifacts in the image corresponding to at least one of the right hand edge of a road, the left hand edge of the road, lane markings defining lanes in the road (col. 4, lines 29-47; col. 7, lines 7-12), the radius of curvature of the lanes and the road, and the heading angles (steering angle, col. 6, lines 31, 32) of the host vehicle relative to the road and lanes.

Regarding claims 6, Sawamoto et al (abstract) disclose the apparatus of Claim 5 in which the image processing unit is further configured to detect points in the image corresponding to lane markings and to convert the points corresponding to lane boundaries (col. 7, lines 7-11) from an image plane to the real world plane (*this is understood as taking an image of the road and displaying the image on a display*).

Regarding claims 7, Sawamoto et al (abstract) disclose the apparatus of Claim 4 in which the image processing unit is configured to apply an edge detection algorithm to the at least one image to detect lines or curves that correspond to lane boundaries.

Regarding claims 8, Sawamoto et al (abstract) disclose the apparatus of Claim 7 in which the image processing unit is configured to perform a tracking algorithm which employs a recursive least squares technique to identify the path of lanes in the at least one image.

Regarding claims 9, Sawamoto et al (abstract) disclose the apparatus of Claim 7 in which the output of the image processing unit comprises data representing lane topography which is passed to the first data processing apparatus (cols. 5-8).

Regarding claims 10, Sawamoto et al (abstract) disclose the apparatus of Claim 9 in which the output of the image processing unit also includes information including the position of the host vehicle relative to the identified lanes and its heading (cols. 5-8).

Regarding claims 11, Sawamoto et al (abstract) disclose the apparatus of Claim 7 in which the first data processing apparatus is configured to determine which lane the host vehicle will occupy when it has traveled the distance to a target vehicle by projecting the path estimated by the vehicle path estimation apparatus and comparing the path estimated by the vehicle path estimation apparatus with lane boundary information at that distance (cols. 5-9).

Regarding claims 12, Sawamoto et al (abstract) disclose the apparatus of Claim 7 in which the vehicle path estimation apparatus is configured to use lane information to determine which lane the host vehicle is presently traveling in (cols. 3-8).

Regarding claims 13, Sawamoto et al (abstract) disclose the apparatus of Claim 7 in which the vehicle path estimation apparatus may estimate the path by projecting a path based upon the heading of the host vehicle (cols. 3-8).

Regarding claims 14, Sawamoto et al (abstract) disclose the apparatus of Claim 12 in which the projected path corresponds to the path of the lane (cols. 5-8).

Regarding claims 16, Sawamoto et al (abstract) disclose the apparatus of Claim 1 in which the vehicle path estimation apparatus includes a yaw sensor which is configured to determine the rate of yaw of the host vehicle in order to provide a measure of the radius of curvature of the path a vehicle is following (cols. 5-8).

Regarding claims 17, Sawamoto et al (abstract) disclose the apparatus of Claim 1 in which the target vehicle detection apparatus comprises an emitter (see radar unit 2, fig. 3) which emits a signal outward in front of the host vehicle and a receiver which is configured to receive a portion of the emitted signal reflected from the target vehicle or objects in front of the vehicle, and a target processing apparatus which is configured to determine the distance between the host vehicle and the target vehicle or object (cols. 3-8).

Regarding claims 18, Sawamoto et al (abstract) disclose the apparatus of Claim 17 in which the emitter and the receiver emit and receive one of radar signals and lidar signals (cols. 3-8).

Regarding claims 19, Sawamoto et al (abstract) disclose the apparatus of Claim 17 in which the distance between the host vehicle and the target vehicle or object is determined by the target processing apparatus based upon the time of flight of a signal from emission of the signal to receipt of a reflected portion of the signal (cols. 3-8).

Regarding claims 20, Sawamoto et al (abstract) disclose an adaptive cruise control system for a host vehicle comprising:

sensing apparatus according to Claim 1 and signal generating apparatus configured to generate a steering bias signal which when applied to a steering system of the vehicle assists in controlling the direction of the vehicle so as to cause the host vehicle to track the target vehicle (see vehicle foll0wing unit, cols. 3-8).

Regarding claims 21, Sawamoto et al (abstract) disclose the control system of Claim 20 in which the signal generating apparatus generates at least one vehicle speed control signal which when applied to a brake system or a throttle control system of the vehicle cause the vehicle to maintain a predetermined distance behind a target vehicle (cols. 3-8).

Regarding claims 22, Sawamoto et al (abstract) disclose the control system of Claim 20 in which at least one of the signals is generated in response to the estimate of the target position determined by the sensing apparatus (cols. 3-8).

Regarding claims 23, Sawamoto et al (abstract) disclose the control system of Claim 20 in which the control signals are only generated for target vehicles that occupy the projected path of the host vehicle (cols. 3-5).

Response to Arguments

5.   Applicants' arguments filed 10/12/07 have been fully considered, but are not persuasive.

The 112 second rejections to claims 2, 11, 15 have been dropped in view of applicant's amendments.

Applicant argues that claim 1 recites, "a target lane that is a prediction of which lane the host vehicle will be located when it has traveled by a distance to a target vehicle along a projected path. The target lane is compared to the position of the target vehicle". The examiner disagrees and notes that in the prior art (col. 9, lines 46 to col. 10, line 11) the processor 62 clearly predicts the position of the host vehicle in a future path is predicted. The processor 62 predicts the future path of the host vehicle relative to a target vehicle when the host vehicle has traveled a distance between the host vehicle and the target vehicle (see particularly col. 9, line 51 and col. 10, lines 5-11). Applicant has ignored and failed to consider the cited sections which anticipate the claims. Further, the positions of host vehicle and the target vehicle in the predicted lane are plotted in successive times t1, t2, t3, etc indicating a progression of the vehicles as they travel into the future in the predicted lane. The host vehicle is shown to maintain a distance behind a target vehicle as both vehicles travel in the predicted lanes. As the host vehicle moves from its current position toward a target vehicle, it is noted that the target vehicle also moves ahead of the host vehicle to another position ahead of the host vehicle. The host vehicle then covers the distance of separation between the host vehicle and the target vehicle after the host vehicle travels to a position previously occupied by the target vehicle. The host vehicle tracks the target vehicle and keeps a historical map of positions occupied by the target vehicle in the predicted lane of travel thus estimating or predicting the future travel path of the target vehicle (see col. 9, line 51 and col. 10, lines 5-11).

The applicants are repeating arguments already addressed in the previous office actions. The responses in the last action are incorporated below.

After the host vehicle of the prior art goes past the distance it maintains the same lane it is in. Therefore the prior has predicted a target lane in which the host vehicle will be located when it has traveled along the projected path by a distance to the target object. It is believed that the applicant has erred in the interpretation of the prior art.

Applicant further argues that the prior art does not predict the target lane. The examiner believes the applicant has erred in the interpretation of the prior art. It is noted that the prior art predicts in the same manner as disclosed in the applicants specification. Applicant uses the word "predict" in the disclosure, but does not particularly disclose how prediction is done. On the other hand, as known in the art, the phrase -- path estimation --, --projected path -- are examples of prediction that the applicant recites in the background section referring to the prior art.

Applicant admits that the prior Sawamoto calculates a future path, see applicant's remarks, page 9, last paragraph. It is not clear what applicant is really arguing here when applicant admits that the prior estimates a path. The applicant further recites that the prior assumes that "the host vehicle WILL TRAVEL in this new lane". See applicant's argument page 11 last two sections. These are all future tenses contrary to applicant's argument that the tenses in Sawamoto are in present tense.

Applicant's arguments are a repeat of arguments already addressed.

It is believed that the prior art still reads on the claims. The rejection therefore stands.

Communication

6.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronnie Mancho whose telephone number is 571-272-6984. The examiner can normally be reached on Mon-Thurs: 9-5.

    If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

    Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

                                            Ronnie   Mancho
                                            Examiner
                                            Art Unit 3663

1/29/2008

/Jack W. Keith/

Supervisory Patent Examiner, Art Unit 3663